



Eric D Donnenfeld

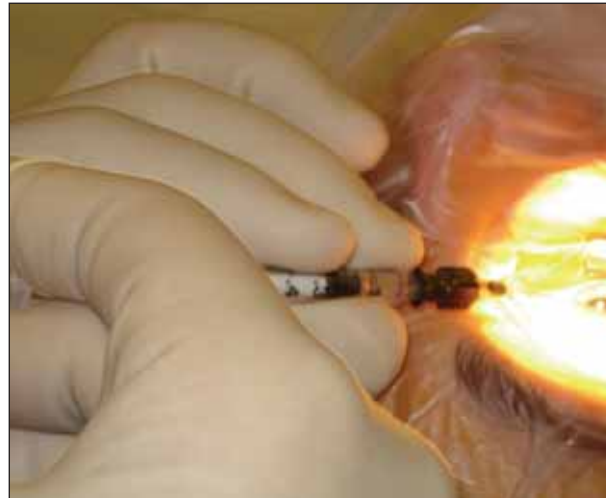


Steve A Arshinoff



Samuel Masket

# Experts disagree on best antibiotic for endophthalmitis prevention



One advantage of Moxifloxacin is that the syringe is easily identifiable by the faint yellow colour

Devon Schuyler  
in Las Vegas

THE use of intracameral antibiotics is an effective way to reduce the risk of endophthalmitis after cataract surgery, according to several recent presentations at the AAO annual meeting. But which agent should you use? One speaker recommended vancomycin, another cefuroxime, and a third moxifloxacin.

Howard V Gimbel MD, of Gimbel Eye Centre in Calgary, Alberta, Canada, pointed out that in the late 80s, the incidence of endophthalmitis in his practice was as high as 0.15 per cent with the use of gentamycin in the irrigating solution and 0.16 per cent with the use of vancomycin in the irrigating solution. But since switching to intracameral vancomycin in 1990, his incidence of endophthalmitis has dropped to just 0.01 per cent.

"This compares favourably with the [0.05 per cent] rate of the ESCRS endophthalmitis study," he said.

Dr Gimbel stated that in addition to using intracameral antibiotics, they have prescribed dexamethasone, neomycin, polymixin B (Maxitrol) or tobramycin, dexamethasone (Tobradex) eye drops one day before surgery, and that they follow a strict operative technique. That means minimising the touch of instruments or the injector to the conjunctiva, using irrigation and aspiration (not "rock and roll") to remove viscoelastics from under the intraocular lens, and securing the wound seal by unrolling the inner lip.

## The case for intracameral cefuroxime

"The best intracameral agent, without a doubt, is cefuroxime," said Eric D Donnenfeld MD, of Ophthalmic Consultants of Long Island.

He cited the ESCRS double-masked controlled prospective trial – published in the *Journal of Cataract and Refractive Surgery*

in 2006, which found that intracameral cefuroxime reduces the incidence of endophthalmitis by 78 per cent compared with a placebo. The rate of endophthalmitis was 0.073 per cent with cefuroxime and 0.335 per cent without cefuroxime.

He also cited a non-controlled retrospective trial published in the *Journal of Cataract and Refractive Surgery* in 2002 that found a 0.06 per cent rate of endophthalmitis with cefuroxime, and a non-controlled prospective trial published in *Acta Ophthalmologica Scandinavica* in 2005 that found a 0.053 per cent rate of endophthalmitis with cefuroxime and a 0.22 per cent rate without.

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**Steve A Arshinoff MD**

Dr Donnenfeld said that although aminoglycosides, vancomycin, and fluoroquinolones have all been used as intracameral antibiotics, cefuroxime is the best choice. Aminoglycosides can be toxic to the retina and macula, and have poor efficacy against Gram-positive organisms. Vancomycin increases the incidence of cystoid macular oedema and has an extremely slow kill curve, and the US Centers for Disease Control specifically recommends that it not be used preventively.

He pointed out that the fluoroquinolones moxifloxacin and gatifloxacin appear to be safe and well tolerated in cataract surgery,

but that further studies of both are needed.

"We can't even think about using these today until we have more information," he said.

He suggested that ophthalmologists await additional safety and controlled efficacy studies before using intracameral antibiotics besides cefuroxime. In the meantime, he suggested that surgeons turn their attention to the question of what topical antibiotic to use in conjunction with intracameral cefuroxime.

"Maybe mixing and matching of intracameral and topical antibiotics is the best approach to provide the best broad-spectrum coverage," he said.

## An argument for moxifloxacin

"Moxifloxacin is the most effective and safest intracameral agent. I've had no infections and no complications... it's been a wonderful drug," said Steve A Arshinoff MD of Toronto, Ontario, Canada.

He said that vancomycin and the cephalosporins (cefazolin and cefuroxime) have the disadvantage of time-dependent efficacy.

"Unfortunately, you don't have much time because the concentration of the drug in the anterior chamber decreases four times in the first hour," he said. This makes time-dependent drugs a poor choice.

By contrast, the fluoroquinolones are concentration-dependent. "If you put them in the eye at a high-enough dose, they will rapidly kill the bacteria," he said.

He also pointed out that moxifloxacin has a far more effective kill curve than cefuroxime. For example, cefuroxime with the injection of 1 mg/0.1 cc, achieving a peak concentration of 2700 mcg/mL produces a log kill of less than one for beta-lactam sensitive *Staphylococcus aureus*. By contrast, moxifloxacin with the injection of 100µg/0.1 cc achieving maximum concentration of 270 mcg/mL, produces a

log kill of greater than three for fluoroquinolone-resistant *S aureus*.

He said that vancomycin doesn't cover Gram-negative bacteria, and that the cephalosporins don't cover methicillin-resistant *S aureus*, methicillin-resistant coagulase-negative *Staphylococcus*, Gram-negative bacteria, and enterococci. By contrast, the fluoroquinolones encounter very little resistance, except some strains of *Pseudomonas*.

In addition, anaphylaxis has been reported with the cephalosporins but not with vancomycin or the fluoroquinolones.

Dilutions are complex for vancomycin and the cephalosporins, and simple for gatifloxacin and moxifloxacin. But moxifloxacin has a "big advantage" over gatifloxacin in that it contains no preservative.

Other advantages of moxifloxacin are that no millipore filter is needed, the syringe is easily identifiable by the faint yellow colour of moxifloxacin, and the solution is inexpensive. One bottle of Vigamox is good for at least 40 cases, Dr Arshinoff said.

All of these factors: dose dependent efficacy, high kill rate, broadest spectrum of activity, minimal risk of allergy, and simplicity of preparation, make it the best drug for intracameral use, stated Dr Arshinoff.

"When you look at the available literature today, only intracameral antibiotics have been established as absolutely beneficial for prevention of postoperative infection. As individuals and societies, we need to insist that studies are carried out that will determine what are the best agents for intracameral use," said Samuel Masket MD, clinical professor of ophthalmology at the Jules Stein Eye Institute, UCLA School of Medicine.

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